

1/8/18 "Do what you are supposed to do."-Mr. Callahan

HW: "Graphs of Functions and Derivatives HW"

Test 3 on Friday 1/12

Midterm on Thursday 1/18

AIM: Graphing Functions and Derivatives

Warm Up:

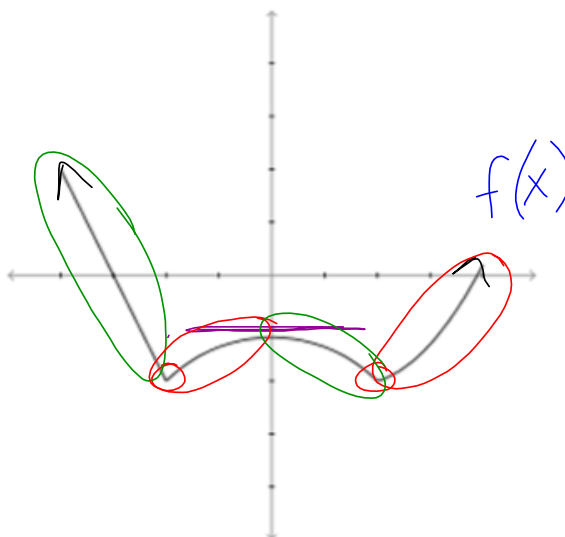
1) What does the 1st Derivative tell us?

Increasing/Decreasing and Possible Max/Min

2) What does the 2nd Derivative tell us?

Concavity and Possible Points of Inflection

Consider the graph of $f(x)$ below:



1. Use the graph to answer the following questions.

(a) Are there any values x for which the derivative $f'(x)$ does not exist?

$$x = -2, 2$$

(corner, cusp
discontinuity)

(b) Are there any values x for which $f'(x) = 0$?

$$x = 0$$

horizontal
tangent

(local max/min
on $f(x)$)

Worksheet

Math 124

Week 3

- (c) This particular function f has an interval on which its derivative $f'(x)$ is constant. What is this interval? What does the derivative function look like there? Estimate the slope of $f(x)$ on that interval.

horizontal
line

est: slope = -2

$(-\infty, -2)$

look for
a straight
line

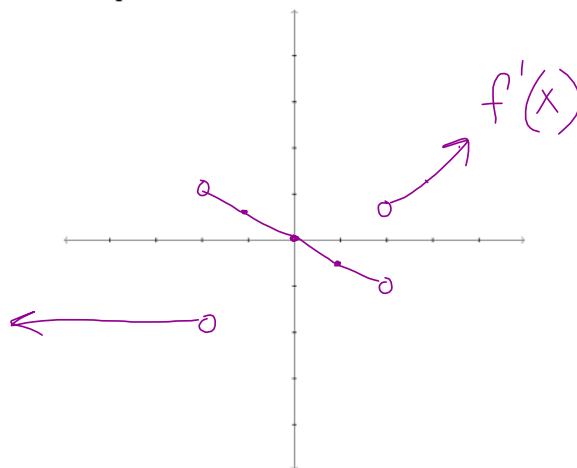
- (d) On which interval or intervals is $f'(x)$ positive?

$(-2, 0)$ and $(2, \infty)$ function is increasing

- (e) On which interval or intervals is $f'(x)$ negative? Again, sketch a graph of the derivative on those intervals.

$(-\infty, -2)$ and $(0, 2)$ $f(x)$ is decreasing

- (f) Now use all your answers to the questions to sketch a graph of the derivative function $f'(x)$ on the coordinate plane below.

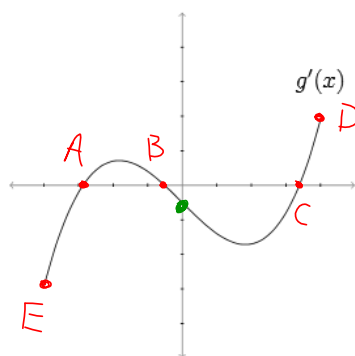


Worksheet

Math 124

Week 3

2. Below is a graph of a derivative $g'(x)$. Assume this is the entire graph of $g'(x)$. Use the graph to answer the following questions about the original function $g(x)$.



- (a) On which interval or intervals is the original function $g(x)$ increasing?

(A, B) and (C, D) $g'(x)$ is above x-axis

- (b) On which interval or intervals is the original function $g(x)$ decreasing?

(E, A) and (B, C) $g'(x)$ is below x-axis

- (c) Now suppose $g(0) = 0$. Is the function $g(x)$ ever positive? That is, is there any x so that $g(x) \geq 0$? How do you know?

Yes b/c the derivative @ $x=0$ is negative therefore the function must be decreasing through the point $(0,0)$. Comes from above x-axis.

Function

- corner, cusp, discontinuity
- linear
- Max/Min

Derivative

- DNE
- horizontal
- x-axis

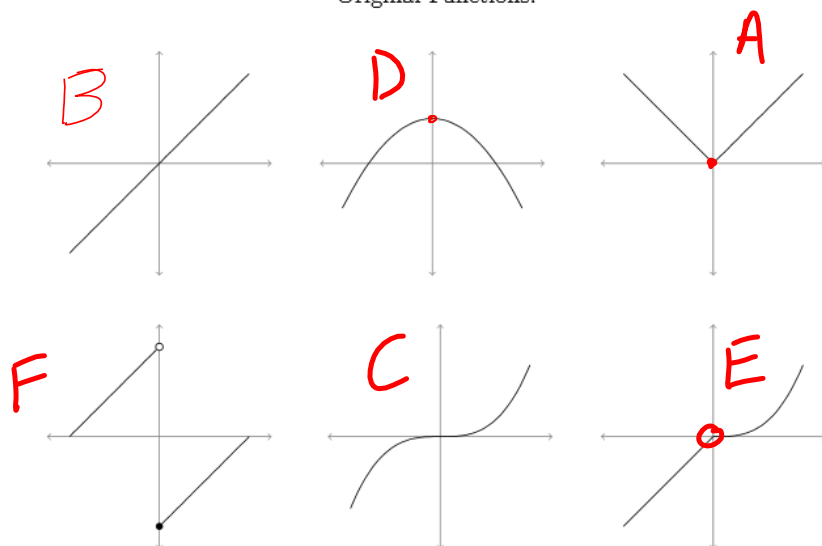
Worksheet

Math 124

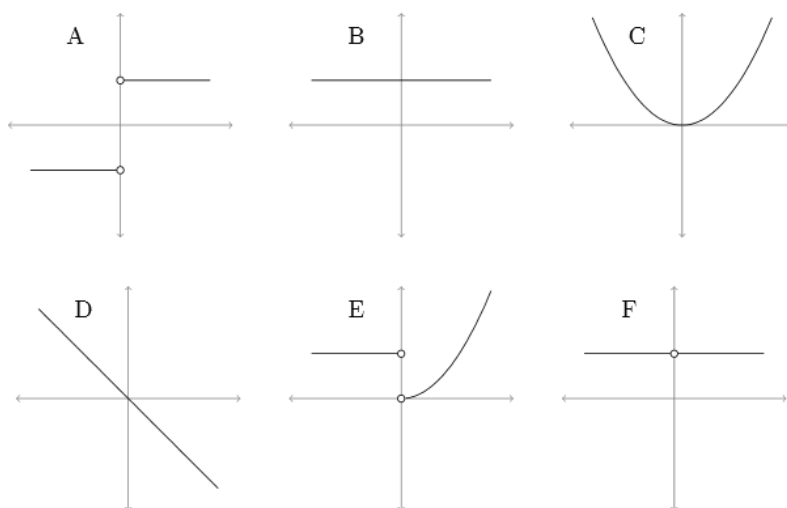
Week 3

3. Six graphs of functions are below, along with six graphs of derivatives. Match the graph of each function with the graph of its derivative.

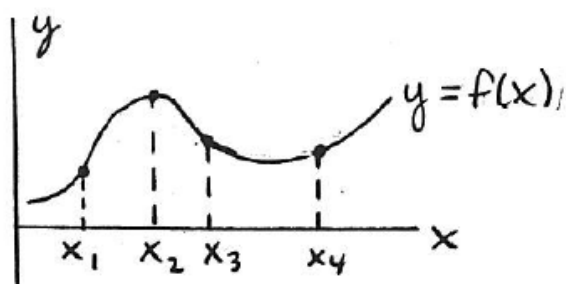
Original Functions:



Their derivatives:



Estimates of Derivatives



Using the graph of $y = f(x)$, fill in $=$, $>$, or $<$:

$$f'(x_2) = 0$$

$$f'(x_4) > 0$$

$$f'(x_3) < 0$$

$$f'(x_1) > 0$$

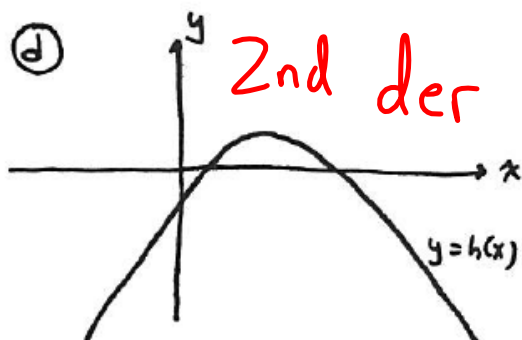
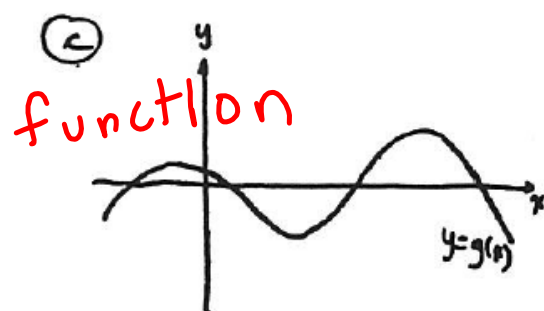
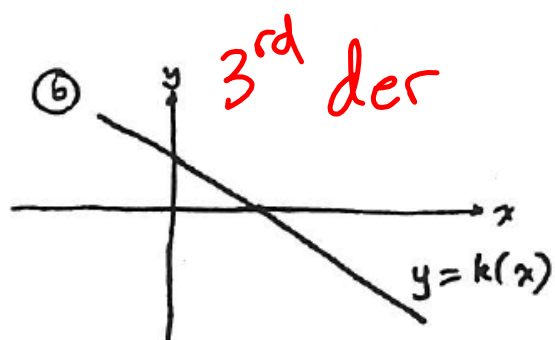
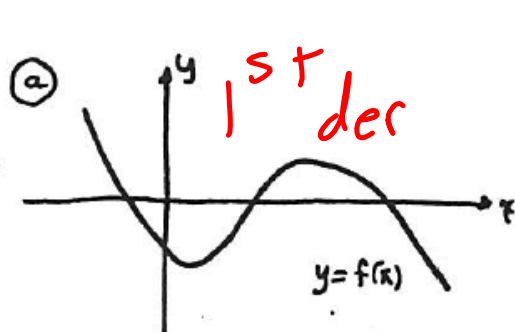
$$f'(x_1) > f'(x_4)$$

$$f'(x_3) < f(x_3)$$

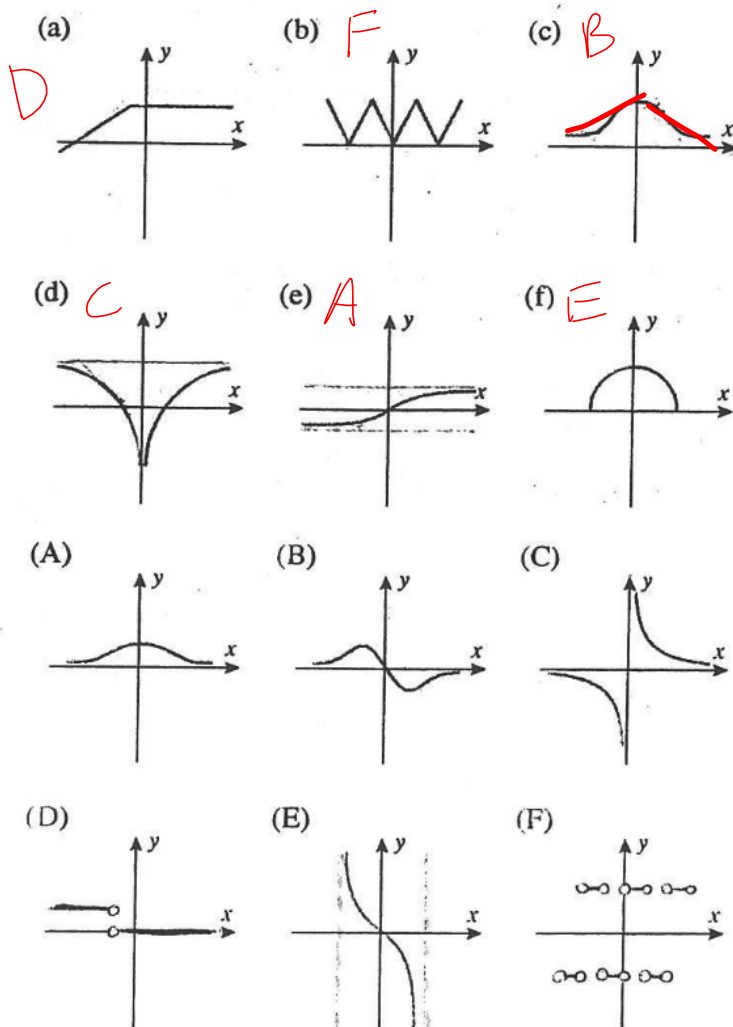
$$f'(x_2) < f'(x_1)$$

$$f'(x_2) > f'(x_3)$$

$$f'(x_3) < f'(x_4)$$

GRAPHING THE DERIVATIVE

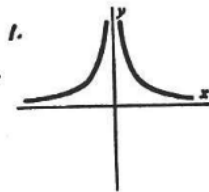
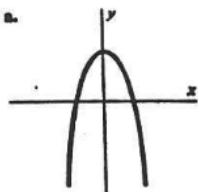
Match the graphs of the functions shown in (a)–(f) with the graphs of their derivatives in (A)–(F).



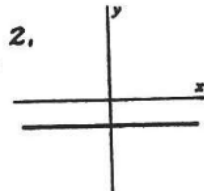
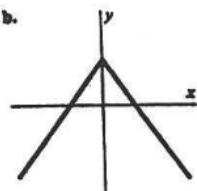
MATCHING QUESTIONS ON GRAPHS OF DERIVATIVES

Each of the Figures (1)-(5) is the graph of the derivative of one of the functions graphed in Figures (a)-(e). Match each function with its derivative.

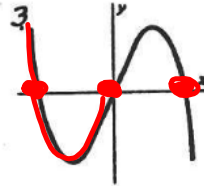
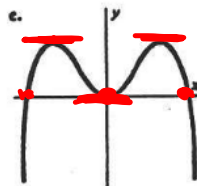
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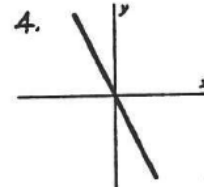
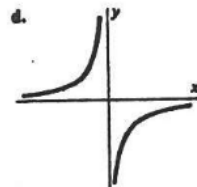
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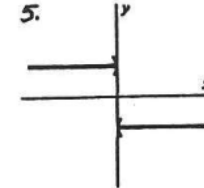
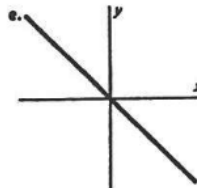
3



1



2



(4)